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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/319,384	06/04/1999	TAKASHI ECHIGO	Q54629	2943

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EXAMINER

PRATS, FRANCISCO CHANDLER

ART UNIT	PAPER NUMBER
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1651

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/319,384	Applicant(s) ECHIGO ET AL.	
	Examiner Francisco C Prats	Art Unit 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,7,8 and 10-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,7,8 and 10-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 25, 2004, has been entered.

The amendment filed May 25, 2004, has been received and entered. The text of those sections of Title 35, U.S. Code, not included in this action can be found in a prior office action.

Claims 1, 5, 7, 8, and 10-17 are pending and are examined on the merits.

Claim Rejections - 35 USC § 103

Claims 1, 5 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al (WO 95/23232).

Andersen discloses a process of preparing a gel from lignosulfonates, wherein a lignosulfonate solution obtainable from a sulfite pulping process is contacted with a phenol oxidizing system to produce the gel. See page 1, lines 6-23. The preferred laccase enzyme used is one from *Myrothecium*, the

Art Unit: 1651

same fungal genus recited in claim 17 under examination. See page 5, line 28, through page 6, line 4. Because Andersen's enzyme is obtained from the same microorganism as recited in the claims under examination, Andersen's enzyme is considered to meet the pH optimum limitation, absent evidence to the contrary. Andersen differs from the cited claims in that Andersen does not disclose the presence of a metal salt, compound or complex.

However, Andersen clearly discloses that before the enzyme is added to the lignosulfonate solution, the pH of the solution may be adjusted to the optimum of the enzyme. See page 6, at lines 13-15. The artisan of ordinary skill clearly would have recognized that numerous buffers suitable for pH adjustment and maintenance include metal salts, for example sodium phosphate. Thus, the artisan of ordinary skill following the teachings of Andersen clearly would have been motivated to have included in Andersen's gel reaction milieu a metal salt so as to buffer and or adjust the pH as taught in Andersen. Moreover, because Andersen's gel product takes several days to form (see page 9, line 8), the initial solution resulting from the mixing of the enzyme, buffer and lignosulfonate would have had a viscosity low enough to have allowed for injection into wood. Thus, Andersen's product clearly meets the intended use recitation in

Art Unit: 1651

applicant's claims. Lastly, the determination of a suitable amount of lignosulfonate for use in forming Andersen's gels must be considered an obvious matter of design choice, the properties of the gel ultimately depending on the amount of lignosulfonate used. Absent some demonstration of an unexpected result coming from the specific amount of lignosulfonate used, a holding of obviousness is required.

Claims 1, 5, 7, 8 and 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haars et al (U.S. Pat. 4,432,291) in view of Conradie (U.S. Pat. 5,399,190).

Haars et al disclose wood binding compositions suitable for binding wood chips together to make particle board, said binding compositions comprising lignin or lignin sulfonate and laccase or catechol oxidase or peroxidase in an aqueous solution. See column 2, line 5, through column 4, line 2. Haars differs from the claims in that Haars' wood binding composition does not include the numerous additional additives recited in the claims. However, Conradie clearly discloses that metal soaps of long chain unsaturated fatty acids such as oleic and linoleic acids act as superior wood preservative agents. See column 1, lines 43-64. Conradie also discloses that the wood preservative compositions disclosed therein may contain any known insecticide

Art Unit: 1651

and/or fungicide, such as pyrethroid, as well as carrier media such as xylene, as well as emulsifiers. See column 2, lines 21-39. Thus, Conradie demonstrates that the claimed additional metals, unsaturated fatty acids and other organics were in fact known wood preserving agents at the time of applicant's invention. Reasonably expecting that adding known wood preserving agents such as those disclosed in Conradie to the enzymatic binder of Haars would have conferred improved properties to Conradie's particle board product, the artisan of ordinary skill would have been motivated to have added known wood preserving agents such as disclosed by Conradie to the enzyme-containing wood binder of Haars.

Moreover, in view of Haars' disclosure of the suitability of peroxidases in the oxidative wood binding composition, the artisan of ordinary skill clearly would have recognized that the hydrogen peroxide required by Haars' peroxidases could have been readily generated enzymatically *in situ*, and would therefore require the presence of the peroxide-generating oxidase enzyme recited in claim 16. The artisan of ordinary skill, recognizing the suitability of generating hydrogen peroxide *in situ* would therefore have been motivated to have included in the enzymatic wood binding composition a peroxide-generating oxidase enzyme, as recited in claim 16.

Art Unit: 1651

It is noted that the claims have been amended to require the composition to be in specific physical forms, and to contain a specific amount of lignosulfonate. However, as discussed above with respect to the Andersen reference, the determination of a suitable amount of lignosulfonate for use in forming Andersen's gels must be considered an obvious matter of design choice, the properties of the gel ultimately depending on the amount of lignosulfonate used. Absent some demonstration of an unexpected result coming from the specific amount of lignosulfonate used, a holding of obviousness is required. Moreover, with respect to the physical forms now required by the claims, note that the claims explicitly encompass a solution which may be "diluted upon use." Because the viscous composition of Haars can be diluted, i.e. thinned out, before injection into wood, the composition of Haars clearly can be put to the intended use recited in the claims. A holding of obviousness is therefore clearly required.

Claims 1, 5, 7, 8 and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haars et al (U.S. Pat. 4,432,291) in view of Conradie (U.S. Pat. 5,399,190), and in further view of Schneider et al (WO 95/01426).

Art Unit: 1651

As discussed above, claims 1, 5, 7, 8 and 10-16 are rendered obvious over Haars when viewed in light of Conradie. Neither Haars nor Conradie disclose the suitability of an enzyme obtainable from *Myrothecium*, as recited in applicant's claim 17, as the oxidase in the preparation of Haars' wood binding composition. However, Schneider discloses numerous compositions for various applications, said compositions comprising an enzyme which may be a laccase, catechol oxidase, bilirubin oxidase from *Myrothecium*, or monophenol monooxygenase (see p. 19, lines 1-27). Schneider's compositions also comprise lignin (see p. 6, line 35 through p.7, line 4), for use in polymerizing lignin so as to prepare wood composites such as chipboard or fiberboard (see claim 18, at p. 46, line 29 through p. 47, line 2). Thus, the artisan of ordinary skill would have reasonably expected that Schneider's bilirubin oxidase from *Myrothecium* would have been useful to polymerize the lignosulfonate in Haars' wood binding composition, based on Schneider's disclosure of the polymerization of chemically similar lignin, which contains the same phenolic moiety as lignin sulfonate required for oxidative enzymatic polymerization. Based on this reasonable expectation of the suitability in Haars' composition of Schneider's bilirubin oxidase from *Myrothecium*, the artisan of ordinary skill would have been motivated to have included Schneider's

Art Unit: 1651

bilirubin oxidase from *Myrothecium* in Haars' wood binding composition. A holding of obviousness is therefore required.

Response to Arguments

All of applicant's argument has been fully considered but is not persuasive of error. Applicant asserts that the "honey" consistency of Haars' laccase/lignosulfonate composition does not allow for injection treatment of wood. However, the claims allow for the composition to be in a form which is "diluted upon use." Thus, even if one were to concede some difficulty with injecting a fluid having the consistency of honey into wood, the viscous composition of Haars can be diluted, i.e. thinned out, before injection into wood. Thus, Haars' composition clearly can be put to the intended use recited in the claims.

Further still, the gel of Andersen clearly takes a significant time to form. Thus, upon initial mixing of the ingredients required to form Andersen's pH-optimized composition, that composition clearly is of a sufficiently thin viscosity allowing for injection into wood. Therefore, Andersen's composition can also be put to the intended use recited in applicant's claims.

With respect to the newly inserted limitations requiring 0.01 to 5% lignosulfonate by weight in the composition, on the

Art Unit: 1651

current record it appears that those concentrations would have been reasonably expected to have functioned in the adhesive of Haars or the gel of Andersen. Thus, the determination of suitable amounts of lignosulfonate in the prior art compositions would have been a matter of design choice on the part of the artisan of ordinary skill, the artisan choosing from among parameters reasonably expected to function in the compositions disclosed by the cited prior art. The rejections of record must therefore be maintained.

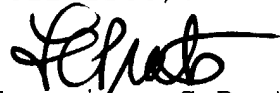
No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francisco C Prats whose telephone number is 571-272-0921. The examiner can normally be reached on Monday through Friday, with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1651

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Francisco C Prats
Primary Examiner
Art Unit 1651

FCP